REMARKS

Claims 43, 45-48, 50, 51, 53, 55-59, 61-64, 66, 67, 69, 71-75, 77-80, 92, 93, 95, 97-101, 103-106, 108, 109, 111, and 113-120 are pending in this application. Claims 43, 50, 59, 66, 75, 92, 99, 101, 108, 115, 117, and 119 have been amended to define more clearly what Applicant regards as his invention. Claims 43, 51, 59, 67, 75, 93, 101, 109, and 117-120 are independent.

Claims 43, 45-48, 50, 51, 53, 55-59, 61-64, 66, 67, 69, 71-75, 77-80, 92, 93, 95, 97-101, 103-106, 108, 109, 111, and 113-120 were rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. 6,141,446, (Boliek).

The present application is directed to improvements in the field of data compression, and more particularly digital image compression.

Claim 43 is directed to a method of compressing data, wherein the data comprises a plurality of transform coefficients, and each transform coefficient is expressible in a format including a plurality of bit symbols. The format comprises a number of leading zero bit symbols and remaining bit symbols. The method includes the step of (a) entropy encoding a number representative of the number of leading zero bit symbols of a current transform coefficient based on a context of a number of transform coefficients or part thereof surrounding the current transform coefficient. The context is based on the number of non-zero transform coefficients or part thereof surrounding the current transform coefficient. The method also includes the step of (b) coding the remaining bit symbols of the current transform coefficient. The method also includes the step of (c) processing another transform coefficient, not previously coded, in accordance with steps (a) and (b).

Among other important features of Claim 43 are the steps of:

> *(a) entropy encoding a number representative of the number of leading zero bit symbols of a current transform coefficient based on a context of a number of transform coefficients or part thereof surrounding said current transform coefficient, said context being based on the number of non-zero transform coefficients or part thereof surrounding the current transform coefficient;*
>
> *(b) coding the remaining bit symbols of the current transform coefficient; and*
>
> *(c) processing another transform coefficient, not previously coded, in accordance with steps (a) and (b).*

Boliek, as understood by Applicant, relates to a compression and decompression system with reversible wavelets and lossy reconstruction. Boliek discusses entropy encoding on a bit-plane basis, in the sense that the bit-planes are encoded one by one in turn, where each bit-plane comprises a plurality bits of like order from a corresponding plurality of coefficients (e.g., column 10, lines 34-35; column 23, lines 26-28 and 41-56; column 24, line 15, to column 25, line 2; Fig. 20; and Tables 7 and 8).

Contrary to Boliek, the method of claim 43 recites encoding coefficient by coefficient, in the sense that a coefficient is completely coded before another coefficient is processed. In this regard, Applicant respectfully traverses the Examiner's comments made in the Office Action (from page 4, line 21, to page 5, line 2), that Boliek at column 29, lines 1 -39, and Fig. 21, discloses the complete coding of transform coefficients in turn. It is submitted that column 29, lines 1-39, and Fig. 21, of Boliek is concerned with the encoding of each bit of each coefficient on a bit-plane basis and thus does not teach or suggest the feature of encoding coefficient by coefficient.

Applicant also respectfully traverses the Examiner's remarks on pages 3-4 of the Office Action that "Boliek teaches a method of ... entropy encoding a number

representative of the number of leading zero bit symbols (see 'entropy encoding' shown at Fig. 206 of figure 2 and mentioned at col. 10, line 25)." Boliek actually states at the portion referred to by the Examiner, i.e., column 10, line 25, that "the results of ordering and modeling comprise decisions (or symbols) to be coded by the entropy encoder 206", which clearly does not disclose the aforementioned feature.

Furthermore, Boliek does not disclose or even suggest the feature defined in claim 43 of "said context being based on the number of non-zero transform coefficients." In this regard, Applicant respectfully traverses the Examiner's statements on page 4 of the Office Action that "the coefficients 'SD', 'DS', and 'DD' refer to the so called 'non-zero coefficients surrounding said current coefficient'". It is clear from Boliek that the labels SD, DS, and DD refer to subbands, not surrounding coefficients within a subband (see column 17, line 17; and column 23, lines 26-28, of that patent). Moreover, Boliek is completely silent on the feature of the present invention as defined in claim 43, that said context is based on the number of non-zero coefficients.

Moreover, Applicant respectfully traverses the Examiner's comments made on page 7, lines 15-19, that Boliek at column 9, line 65, to column 10, line 2, and Figs. 13 and 19, discloses "processing another transform coefficient not previously coded." It is clear that, column 9, line 65, to column 10, line 2, of Boliek is concerned with the generation of wavelet transforms and is completely silent as to the coding process, if any, that is to be performed. Furthermore, Figs. 13 and 19 are concerned with the context model of the coding and are completely silent as to the processing aspect of the coding. Moreover, it is quite clear that Boliek as a whole does not disclose the feature of the

present invention as defined in claim 43 of "processing another transform coefficient, not previously coded, in accordance with steps (a) and (b)".

In summary, therefore, it is submitted that, as Boliek encodes on a bit-plane basis, it is completely different from method of Claim 43, which encodes coefficient by coefficient.

Accordingly, Applicant submits that Claim 43 is patentable over Boliek.

Independent Claims 59, 75, 101, 117, and 119 each include similar features to those discussed above in connection with Claim 43. Accordingly, these claims are believed to be patentable for substantially similar reasons to those discussed above in connection with Claim 43.

Claim 51 is directed to a method of compressing data, the data comprising a plurality of transform coefficients. Each transform coefficient is expressible in a format comprising a plurality of bit symbols. The method includes the step of (a) entropy encoding one of the bit symbols, not previously entropy coded, of a current transform coefficient based on a context of a number of surrounding bit symbols and on whether or not the most significant bit symbol of the current coefficient has been previously entropy coded. The context is based on the number of non-zero transform coefficients surrounding the current transform coefficient. The method further includes the steps of (b) repeating step (a) a predetermined number of times for the current transform coefficient, and (c) processing another transform coefficient, not previously entropy coded, in accordance with steps (a) and (b).

Among the notable features of Claim 51 are:

(a) entropy encoding one of said bit symbols, not previously entropy coded, of a current transform coefficient

based on a context of a number of surrounding bit symbols and on whether or not the most significant bit symbol of the current coefficient has been previously entropy coded, said context being based on the number of non-zero transform coefficients surrounding said current transform coefficient;

(b) repeating step (a) a predetermined number of times for the current transform coefficient; and

(c) processing another transform coefficient, not previously entropy coded, in accordance with steps (a) and (b).

Applicant respectfully traverses the Examiner's comments on page 5, lines 3-8 of the Office Action that "Boliek further teaches repeating entropy encoding a predetermined number of times for the current transform coefficient (see items 2104 and 2110 of Fig. 21)".

Firstly, those parts of Boliek (i.e., items 2104 and 2110 of Fig. 21) relied on in the Office Action in support of the rejection completely fail to disclose or even suggest the aforementioned steps defined in Claim 51. It is clear that the step 2104 is concerned with wavelet transformation and does not disclose the feature of repeated entropy encoding of a current coefficient as defined in Claim 51. In addition, it is clear that the step 2110 is concerned with encoding tiles and does not disclose the feature of repeated entropy encoding of a current coefficient. Furthermore, it is submitted that Boliek as a whole does not disclose or even suggest the aforementioned steps of entropy encoding, repeating, and then processing another transform coefficient as defined in Claim 51. As mentioned above, Boliek encodes on a bit-plane basis, and does not disclose encoding coefficient by coefficient as defined in Claim 51.

Secondly, Boliek appears to be silent as to the feature of Claim 51, of entropy encoding the bit symbol based on a number of surrounding bit symbols and *on*

whether or not the most significant bit symbol of the current coefficient has been previously entropy coded.

In summary, it is clear that, as Boliek encodes on a bit-plane basis, it is completely different from the method of Claim 51, which encodes coefficient by coefficient.

Accordingly, Applicant submits that Claim 51 is patentable over Boliek.

Independent Claims 67, 93, 109, 118, and 120 each include similar features to those discussed above in connection with Claim 51. Accordingly, these claims are believed to be patentable for substantially similar reasons to those discussed above in connection with Claim 51.

A review of the other art of record has failed to reveal anything which, in Applicant's opinion, would remedy the deficiencies of the art discussed above, as references against the independent claims herein. Those claims are therefore believed patentable over the art of record.

The other claims in this application are each dependent from one or another of the independent claims discussed above and are therefore believed patentable for the same reasons. Since each dependent claim is also deemed to define an additional aspect of the invention, however, the individual reconsideration of the patentability of each on its own merits is respectfully requested.

In view of the foregoing amendments and remarks, Applicant respectfully requests favorable reconsideration and early passage to issue of the present application.

Applicant's undersigned attorney may be reached in our New York office by telephone at (212) 218-2100. All correspondence should continue to be directed to our below listed address.

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